LISTING OF CLAIMS:

1. (Currently amended) A network device for routing [[a]] mobile IP packets ~~packet~~, the network device comprising:

    a control plane processor;

    a forwarding plane processor coupled to the control plane processor, the forwarding plane processor to maintain a binding cache to associate original destination addresses with respective replacement destination address, based on information obtained from one or more routers, the forwarding plane processor also to maintain a forwarding table to associate destination addresses with output interfaces of the network device; and

    a fastpath ~~processor coupled~~ engine responsive to ~~the forwarding plane processor and~~ the control plane processor, the fastpath ~~processor~~ engine capable of operations comprising:

    receiving ~~the mobile IP packet,~~ a mobile IP packet addressed to a destination address;

    looking ~~up a~~ for the destination address of the mobile IP packet in the binding cache ~~maintained by the Forwarding Plane Processor~~ to determine if an entry exists to associate a replacement destination address with the destination address for the mobile IP ~~packet, and~~ packet;

    encapsulating the mobile IP packet to the replacement destination address, in response to finding the entry for the mobile IP packet in the binding cache;

    looking for the replacement destination address in the forwarding table, to determine if an entry exists to associate an output interface with the replacement destination address;

    forwarding the encapsulated mobile IP packet to [[a]] the replacement destination address obtained from ~~corresponding to the entry in~~ the binding cache, via the output interface obtained from the forwarding table; and

    routing the mobile IP packet to the forwarding plane processor, in response to finding no entry for the mobile IP packet in the binding cache;

    wherein the forwarding plane processor is capable of routing the mobile IP packet to the control plane processor; and

the control plane processor is capable of instructing the forwarding plane processor to add an entry for the mobile IP packet to the binding cache maintained by the forwarding plane processor.

2. (Cancelled)

3. (Currently amended) The network device according to Claim 1 wherein the fastpath engine comprises software to execute on the forwarding plane processor and the fastpath processor comprise a single processor.

4-5. (Cancelled)

6. (Currently amended) The network device according to ~~Claim 4~~ Claim 1 wherein the control plane processor is capable of verifying the mobile IP packet.

7. (Cancelled)

8. (Original) The network device according to Claim 1 wherein the mobile IP packet is encapsulated and the entry in the binding cache corresponds to a destination specified by an inner portion of the mobile IP packet.

9. (Currently amended) The network device according to Claim 8 wherein the fastpath ~~processor~~ engine is further capable of decapsulating the mobile IP packet and forwarding the decapsulated mobile IP packet to the destination.

10. (Cancelled)

11. (Currently amended) The network device according to Claim 6 wherein the control plane processor is further capable of ~~at least one of~~:

adding entries to a copy of the binding cache;

deleting entries from the copy of the binding cache;

~~instructing the forwarding plane processor to perform at least one of adding and deleting binding entries from the binding cache;~~

initiating and aborting proxy neighbor advertisements in response to additions to and deletions from the binding ~~cache,~~ cache;

performing security functions;

performing discovery functions; and

performing management functions.

12. (Currently amended) The network device according to ~~Claim 5~~ Claim 1 wherein the forwarding plane processor is further capable of ~~at least one of~~:

monitoring an interface between the forwarding plane processor and the control plane processor;

responding to activate neighbor proxy advertisement and deactivate neighbor proxy advertisement calls; and

maintaining the binding cache by responding to instructions from the control plane processor to

add bindings to the binding cache,

delete bindings in the binding cache,

purge bindings in the binding cache, and

activate and deactivate the network device.

13-28. (Cancelled)

29. (New) A method of routing mobile IP packets, comprising:

maintaining, by a forwarding plane processor in a network device, a binding cache in the network device and a forwarding table in the network device, wherein the binding cache associates original destination addresses with respective replacement destination address, based on information obtained from one or more routers, and the forwarding table associates destination addresses with output interfaces of the network device;

performing, by a fastpath engine of the network device, operations comprising:

receiving a mobile IP packet addressed to a destination address;

looking for the destination address of the mobile IP packet in the binding cache to determine if an entry exists to associate a replacement destination address with the destination address for the mobile IP packet;

encapsulating the mobile IP packet to the replacement destination address, in response to finding the entry for the mobile IP packet in the binding cache;

looking for the replacement destination address in the forwarding table, to determine if an entry exists to associate an output interface with the replacement destination address;

forwarding the encapsulated mobile IP packet to the replacement destination address obtained from the binding cache, via the output interface obtained from the forwarding table; and

routing the mobile IP packet to the forwarding plane processor, in response to finding no entry for the mobile IP packet in the binding cache;

routing the mobile IP packet from the forwarding plane processor to a control plane processor; and

from the control plane processor, instructing the forwarding plane processor to add an entry for the mobile IP packet to the binding cache.

30. (New) A method according to Claim 29, wherein the fastpath engine comprises software to execute on the forwarding plane processor.

31. (New) A method according to Claim 29, further comprising:

    the control plane processor verifying the mobile IP packet.

32. (New) A method according to Claim 31, wherein the control plane processor performs further operations comprising:

    adding entries to a copy of the binding cache;

    deleting entries from the copy of the binding cache;

    initiating and aborting proxy neighbor advertisements in response to additions to and deletions from the binding cache;

    performing security functions;

    performing discovery functions; and

    performing management functions.

33. (New) A method according to Claim 29, wherein the mobile IP packet is encapsulated and the entry in the binding cache corresponds to a destination specified by an inner portion of the mobile IP packet.

34. (New) A method according to Claim 33, further comprising:

    the fastpath engine decapsulating the mobile IP packet and forwarding the decapsulated mobile IP packet to the destination.

35. (New) A method according to Claim 29, wherein the forwarding plane processor performs further operations comprising:

monitoring an interface between the forwarding plane processor and the control plane processor;

responding to activate neighbor proxy advertisement and deactivate neighbor proxy advertisement calls; and

maintaining the binding cache by responding to instructions from the control plane processor to

add bindings to the binding cache,

delete bindings in the binding cache,

purge bindings in the binding cache, and

activate and deactivate the network device.

36. (New) An article, comprising a machine-accessible medium having stored thereon instructions that, when executed by a network device, cause the network device to perform operations comprising:

maintaining, by a forwarding plane processor in the network device, a binding cache in the network device and a forwarding table in the network device, wherein the binding cache associates original destination addresses with respective replacement destination address, based on information obtained from one or more routers, and the forwarding table associates destination addresses with output interfaces of the network device;

performing, by a fastpath engine of the network device, operations comprising:

receiving a mobile IP packet addressed to a destination address;

looking for the destination address of the mobile IP packet in the binding cache to determine if an entry exists to associate a replacement destination address with the destination address for the mobile IP packet;

encapsulating the mobile IP packet to the replacement destination address, in response to finding the entry for the mobile IP packet in the binding cache;

looking for the replacement destination address in the forwarding table, to determine if an entry exists to associate an output interface with the replacement destination address;

forwarding the encapsulated mobile IP packet to the replacement destination address obtained from the binding cache, via the output interface obtained from the forwarding table; and

routing the mobile IP packet to the forwarding plane processor, in response to finding no entry for the mobile IP packet in the binding cache;

routing the mobile IP packet from the forwarding plane processor to a control plane processor; and

from the control plane processor, instructing the forwarding plane processor to add an entry for the mobile IP packet to the binding cache.

37. (New) An article according to Claim 36, wherein the instructions implement a fastpath engine to execute on the forwarding plane processor.

38. (New) An article according to Claim 36, wherein the operations further comprise:
the control plane processor verifying the mobile IP packet.

39 (New) An article according to Claim 38 wherein the instructions cause the control plane processor to perform operations comprising:

adding entries to a copy of the binding cache;

deleting entries from the copy of the binding cache;

initiating and aborting proxy neighbor advertisements in response to additions to and deletions from the binding cache;

performing security functions;

performing discovery functions; and

performing management functions.

40. (New) An article according to Claim 36, wherein the mobile IP packet is encapsulated and the entry in the binding cache corresponds to a destination specified by an inner portion of the mobile IP packet.

41. (New) An article according to Claim 40, wherein the operations further comprise:
    the fastpath engine decapsulating the mobile IP packet and forwarding the decapsulated mobile IP packet to the destination.

42. (New) An article according to Claim 36, wherein the instructions cause the forwarding plane processor to perform operations comprising:
    monitoring an interface between the forwarding plane processor and the control plane processor;
    responding to activate neighbor proxy advertisement and deactivate neighbor proxy advertisement calls; and
    maintaining the binding cache by responding to instructions from the control plane processor to
        add bindings to the binding cache,
        delete bindings in the binding cache,
        purge bindings in the binding cache, and
        activate and deactivate the network device.